PRIZE AWARDS OF THE ROYAL SOCIETY OF EDINBURGH.

At a meeting of the Royal Society of Edinburgh on January 9 the prizes awarded by the council were presented by the chairman, Prof. J. Geikie. We have received the following particulars of the awards:—

The Gunning Victoria Jubilee prize for 1900–4 was awarded to Sir James Dewar, LL.D., D.Sc., F.R.S., &c., for his researches on the liquefaction of gases, extending over the last quarter of a century, and on the chemical and physical properties of substances at low temperatures, his earliest papers being published in the *Transactions and Proceedings* of the society.

In 1867 Mr. James Dewar read a paper to this society on the oxidation of phenol to oxalic acid. This, his first contribution to the aromatic compounds, was followed by a more important one on the oxidation of picoline, which he gave to the British Association in 1868, and in a fuller form to this society in 1870. In this he proposed a graphic formula of pyridine, which expresses the relation between the constitution of benzene and that of pyridine, now universally recognised.

Dewar's experiments on the liquefaction of gases extend over the last quarter of a century, and have culminated in the production of liquid and solid hydrogen in large quantities, so that as thirty-five years ago he studied the chemical and physical properties of hydrogenium solidified in palladium, he has now given us the properties of the solid element, hydrogen itself. Having thus in his hands the means of preparing large quantities of liquefied gases, and having devised most ingenious arrangements for keeping these very volatile liquids for a long time with only a small loss from evaporation, he made good use of the opportunity for examining the chemical and physical properties of substances at extremely low temperatures. The results of these inquiries are of the highest interest and importance. For this long series of investigations in chemistry and physics, characterised by ingenuity, skill, and perseverance, and crowned with success, the council has awarded to Sir James Dewar the Gunning Victoria Jubilee prize.

The Keith prize for 1901–3 was awarded to Sir William Turner, K.C.B., LL.D., F.R.S., &c., for his memoir entitled "A Contribution to the Craniology of the People of Scotland," published in the *Transactions* of the society, and for his "Contribution to the Craniology of the People of the Empire of India," parts i., ii., likewise published in the *Transactions* of the society.

These memoirs, important as they are, form a comparatively small part of the work which Sir William Turner has done in the field of physical anthropology. More especially should notice be taken of the two elaborate reports which he published on the crania and other bones of the human skeleton which were collected by the *Challenger* Expedition. These reports are not only valuable on account of the information which they convey regarding the physical characters of many races of mankind, but also because they establish methods of craniological and anthropometrical research which have very generally been accepted in this country by workers in the same field.

Four great leaders have been chiefly instrumental in developing that branch of science which has received the name of physical anthropology: Broca in France, Huxley and Flower in England, Turner in Scotland.

The Makdougall-Brisbane prize for 1902–4 was awarded to Mr. John Dougall, M.A., for his paper on an analytical theory of the equilibrium of an isotropic elastic plate, published in the *Transactions* of the society.

The problem of the deformation of an isotropic elastic plate under given forces has occupied the attention of mathematicians from the time of Lamé. The solution given by Lamé himself is merely formal; the integrals by which that solution is expressed are not only very complicated, but are not convergent, and they do not lead to the approximate theory.

In his memoir Mr. Dougall makes a new departure, and develops a method that has important applications in other branches of applied mathematics. By an exceedingly skilful use of Cauchy's theory of contour integration, certain integrals, which in Lamé's solution are not convergent, are transformed into highly convergent series, and the modifications which are necessary to secure convergence lead at once to the most significant terms of the solution. The theorem of Betti is applied to develop a method, analogous to the method of Green's function in the theory of the potential, by which the properties of the solution for a finite plate can be deduced from that for an infinite plate, and here, as elsewhere throughout the memoir, numerous results are obtained which have great value both for pure and for applied mathematics. The memoir confirms the ordinary approximate theory, but extends it in various directions; for example, the edge conditions given by Kirchhoff in correction of Poisson are found directly from the mathematical investigation, without the aid of any special physical hypothesis, and are carried to a higher degree of approximation than by Kirchhoff himself. The memoir contains much acute analysis, and strikes out a new method of treating the problems of mathematical physics that seems likely to be of great value in future investigations.

The Neill prize for the period 1901–4 was awarded to Prof. John Graham Kerr, M.A., for his researches on *Lepidosiren paradoxa,* published in the *Philosophical Transactions* of the Royal Society, London.

This work includes an account of the embryological material collected during an expedition specially organised for the purpose to the Grand Chaco of South America in the years 1896–7. The general biology and habits of Lepidosiren are described, the external features of development are fully dealt with, and in a discussion of the general bearings of the phenomena considered reference is made to, amongst other things, the relations of the protosoma to the body of the vertebrate, to the origin of the spiral valve, and to the morphological significance of the external gills which it is suggested are the persisting representatives of the organs from which the limbs of vertebrates have been evolved.

After the presentation of the prizes, Sir James Dewar gave a lecture on the properties of liquid air, with special reference to charcoal vacua, being a sequel to a paper communicated to the society by Prof. Tait and himself in 1875 (see Nature, vol. xii. p. 217). Many of the familiar properties of liquid air were demonstrated by a series of experiments. Of particular interest were its use as a calorimeter and its employment in cooling charcoal in a vacuum tube so as greatly to diminish the density of the rarefied gas. By this means the tube gradually passed through all the well known stages from the ordinary bright discharge to the condition of evident striation and so to the Röntgen ray stage, and finally to the non-conducting state. When the liquid air was removed the charcoal gradually heated up to the ordinary temperature, and the tube passed back again through the stages in the reverse order. The phosphorescence at very low temperatures of certain substances not phosphorescent at ordinary temperatures was also demonstrated; also the production of luminous effects due to the electrification of a certain crystal on being cooled down to the temperature of liquid air.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

Cambridge.—Mr. R. H. Lock has been appointed assistant curator of the herbarium for four years from January 1. He succeeds Mr. Yapp, who was some time ago elected professor of botany at Aberystwyth.

Prof. Sorley has been appointed chairman of the examiners for the moral sciences tripos.

The Sedgwick Museum Building Syndicate has issued a final report, from which it appears that the total cost of the building and fittings is 49,389*l.* 2*s.* 3*d.*, of which sum 26,125*l.* has been furnished by the Sedgwick memorial trustees, besides 1050*l.* appropriated to the bronze statue sculptured by Mr. Onslow Ford.

In connection with the recently established diploma and final examination for the degree in geography, the Board of Geographical Studies has issued a list of eight lectures which amply cover the syllabus for these examinations. Besides the lectures on geography in general by Mr. Yule Oldham, Mr. Hinks is lecturing on geographical surveying, Dr. Marr on geomorphology, and Dr. Haddon on anthropogeography.

The recently established board of anthropology announce some thirteen courses of lectures which seem to embrace the world, ancient and modern. Prof. Ridgeway deals with Greek and Roman numismatics, Mr. Green with Egyptology, Mr. Johns with Assyriology and the social customs of Babylonia, Mr. Chadwick with those of the Anglo-Saxons, whilst Dr. Haddon lectures on the ethnology of Southern Asia, Baron von Hügel on the Melanesians and Polynesians, and Mr. Minns on the ancient ethnology of eastern Europe. Special courses on the sacred character and magical functions of kings in early society, and on physical anthropology, are to be delivered by Mr. J. G. Frazer and Mr. Duckworth.

LONDON.—The Drapers' Company has voted to University College the sum of 400*l.* a year for the next five years towards assisting further the statistical work and higher teaching of the department of applied mathematics. The Mercers' Company has voted the sum of 1000*l.* for providing for the chair of physiology at the college. Dr. Atkinson has been appointed an honorary demonstrator in the department of organic chemistry.

EDINBURGH.—The Senate has submited a resolution to the University Court expressing the view that the time has come for the recognition of geography as a subject for graduation in arts and science, and requesting that the court should take steps as soon as possible to obtain such alteration of the ordinances as may be necessary to that end. It was agreed that when the framing of a new and amending ordinance in arts comes before the court, the question of giving an adequate position to geography shall be given due consideration.

DUBLIN.—The Provost and senior fellows of Trinity College have accepted an offer made by Sir John Nutting, of St. Helens, county Dublin, to endow for a period of five years ten annual entrance exhibitions each of the value of 100*l.* (50*l.* per annum for two years). The exhibitions are to be awarded without further examination, and at the discretion of the Board of Trinity College, to ten young men or women who have competed with success at the senior or middle grade examinations of the Board of Intermediate Education in Ireland. The exhibitions will be confined to pupils of Irish secondary schools (Protestant and Roman Catholic) which have no other endowment than the "results fees" of the Intermediate Board, any other endowment to act as a disqualification.

MR. STANLEY H. TURNER, assistant in political economy at Glasgow, has been appointed lecturer in political economy in the University of Aberdeen, and a full qualifying course of lectures will in future be given by him.

DR. KARL BOEHM, of Heidelberg, and Dr. Hugo Kaufmann, of Stuttgart Technical College, have been appointed extraordinary professors for mathematics and chemistry respectively.

MRS. MACLOGHLIN, of Southport, recently made an offer to the Royal College of Surgeons of England to found scholarships in memory of her husband, the late Mr. E. Percy P. Macloghlin. Mrs. Macloghlin proposes, in five years from the date of her husband's death, to give to the college a sum of 10,000*l.* for the purpose of endowing these scholarships, which are intended to assist young students in need of financial help to proceed with their professional studies. The council of the college has accepted Mrs. Macloghlin's munificent offer, and has agreed to administer the trust.

THE president of the Board of Education has appointed the Right Hon. R. B. Haldane, K.C., M.P., to be chairman of the departmental committee which is inquiring into the present and future working of the Royal College of Science and Royal School of Mines, South Kensington, in succession to Sir Francis Mowatt, G.C.B., who will, however, remain a member of the committee. It may be remembered that the terms of reference to the committee are as follows:—To inquire into the present working of the Royal College of Science, including the School of Mines; to consider in what manner the staff, together with the buildings and appliances now in occupation or in course of construction, may be utilised to the fullest extent for the promotion of higher scientific studies in connection with the work of existing or projected institutions for instruction of the same character in the metropolis or elsewhere; and to report on any changes which may be desirable in order to carry out such recommendations as they may make.

THE annual meeting of the Incorporated Association of Headmasters was held at the Guildhall on January 11 and 12. In his presidential address, the Rev. James Went said that, speaking broadly, the difference between the English and the German educational ideal has been that the Germans have recognised the paramount importance of secondary education and the English have not. It is, however, being recognised gradually that the word "secondary" connotes, not a social distinction, but one of attainment. The recognition of this fact is, Mr. Went believes, largely due to boys of ability and good character who, under the name of exhibitioners or county council scholars, have during the last thirty years been admitted freely into grammar schools, and of whom many have afterwards won the highest distinctions at the universities. It appears likely that the number of boys of this class will be increased as time goes on. The address also dealt with the education of pupil teachers at secondary schools and with the recent regulations for secondary schools issued by the Board of Education. The following resolution was adopted:—"That this association regards the new regulations for secondary schools with satisfaction in general, but regrets that the Board of Education does not provide (*a*) for the calculation of grants upon terminal attendance; (*b*) for the recognition of advanced courses to follow upon the existing four-years' course; (*c*) for ensuring comparative freedom of curricula to schools satisfying certain tests of a higher liberal education; (*d*) for an elastic percentage division of the whole school time when prescribing for groups of subjects, in place of the existing rigid minima of hours or periods in each week. A rider was adopted also declaring that the financial basis on which grants are calculated is not at all adequate, and protesting against any application of the new regulations to secondary schools hitherto earning grants from the board, which would result in such schools receiving grants on a lower basis than in the past.

AT the second day's meeting of the Incorporated Association of Headmasters the following resolutions were adopted after discussion:—(1) That in the opinion of this association it is desirable that the universities should institute a twofold entrance examination (*a*) for candidates proceeding to degrees in arts, in general as at present, but with a higher standard in literary subjects; (*b*) for candidates proceeding to degrees in mathematics and science, with a modern language, including translation at sight, composition, and an oral test, as an alternative for Greek. (2) That the provision for papers in English and history, and for the omission of Paley's "Evidences" from the Cambridge previous paper as laid down in the first report of the Cambridge Studies Syndicate, should be insisted upon in examinations under both (*a*) and (*b*) above. (3) That a new degree in mathematics and in science should be instituted, differing in title from the degree in arts, but of precisely the same university standing. The Rev. R. D. Swallow, in moving the resolutions, said he would not add anything to the arguments on either side of the vexed question as to whether the study of Greek is to be compulsory for students who sought admission to the ancient universities. It is a question which has often been debated by the association, and now in later years, as the subject has assumed a more prominent place in all questions about the curricula of the universities and the secondary schools, the association has gradually focussed its view of it in favour of relaxation for candidates for admission at the university who are able to prove themselves worthy of high honours in mathematics or natural science.

Mr. Arnold-Forster, Secretary of State for War, attended on Monday the first lecture of a course on military history and strategy at the University of London; and at the conclusion of the lecture spoke on army education. In the course of his remarks, he said:—If we have had one thing more than another to admire in the great military example in the Far East, it is the way in which the officers' corps of a great and friendly nation have succeeded in combining the maximum of devotion with the maximum of intelligence in the effective service of their country. In our Army we can find officers in every rank and branch of the service who will challenge comparison with the officers of any army in the world; but the diffusion of intelligence and education throughout the officers of the Army is not so great as it ought to be. This is not peculiar to the Army; it is characteristic of every profession in the country; and what this country is now feeling acutely is that we have so long subsisted on an educational basis inadequate to the needs of modern life. The time has come for the public schools to render to the Army greater service than they do now. Numbers of young men come up for the Army from the public schools with a totally inadequate knowledge of the language of every country but their own, and with an inadequate knowledge of the history and literature of their own country, as well as of the history and literature of every other country. That must all be changed. Young men ought to come up from the public schools instructed in the great science of geography. Now they are practically without any knowledge whatever of one of the sciences which, more than any other, is the reasonable foundation for the studies of an officer in the Army. There is an extraordinary lack in this country—which of all others ought to be well posted in this branch of science—of a proper knowledge of geography. We might be compelled to establish in this country for the Army schools like those which have been already established for the Navy, or like the college at West Point in the United States. The time has almost come when it would be wise to establish a great college like West Point, where the equipment, staff, and method should be as complete as possible, and where candidates should be taken not only for the Army, but for all the great departments of the State, and where even those who have no intention of entering the service of the State may be allowed to receive instruction.

SOCIETIES AND ACADEMIES.

PARIS.

Academy of Sciences, January 9.—M. Troost in the chair.—The external or superficial conductivity representing for a given body the cooling power of a fluid current: J. **Boussinesq**.—The micrographical study of the meteorite of the Diablo Canyon: H. **Moissan** and F. **Osmond**. The micrographical study of this meteorite has shown that the metallic parts, apparently homogeneous, frequently contain irregular microscopic nuclei formed of superposed layers of phosphide and carbide of iron. A detailed examination of nodules which have not been submitted to external oxidation made it clear that they are formed of sulphide of iron surrounded by successive layers of iron phosphide and carbide. In certain cases the laminated structure of the nodules showed that they had been submitted to very considerable pressures.—Trypanosomiasis and the tsetse-fly in French Guinea: A. **Laveran**. Specimens of Glossina, or the tsetse-fly, have been found in all parts of French Guinea, and in places where the existence of diseases due to trypanosomes has been already demonstrated. These trypanosomes attack horses as well as human beings, and a detailed account of the course of the disease in a horse, together with the results of a *post-mortem* examination of the animal, are given.—Observations on the Borrelly comet (December 28, 1904) made with the large equatorial at the Observatory of Bordeaux: G. **Rayet**. Two sets of observations were made on December 31, 1904, and one on January 2. On the latter evening the sky was clear, and the comet appeared as a nearly round nebulosity of about 1′ in diameter, possessing a stellar nucleus of the thirteenth magnitude.—On a method of reading large surfaces of mercury: A. **Berget**. A collimator with a well illuminated very narrow slit is placed behind the column to be read, and an ungraduated thermometer tube in front. A luminous line, the focal line of a cylindrical mirror, is formed, and ends with great sharpness at a fixed point, which can be read off in a cathetometer with an accuracy of 0·01 mm.—The attraction observed between liquid drops suspended in a liquid of the same density: V. **Cremieu**. Drops of olive oil, suspended in a mixture of alcohol and water of as nearly as possible the same density as the oil, ascend or descend in a vertical straight line, with extreme slowness, if precautions against changes of temperature and shaking are taken. If two or more drops are present in the dilute alcohol at the same time, there is an attraction between the two drops which is manifested by their following curved paths instead of vertically straight ones.—On the photogenic radio-active properties of calcined coral placed in a radiant vacuum and submitted to the influence of the kathode rays: Gaston **Séguy**. Amongst various substances examined calcined coral (carbonate of lime and magnesia) gave the most intense phosphorescence as measured by the action on a photographic plate. Phosphorescent coral excites the fluorescence of barium platinocyanide screens, and is very rich in ultra-violet rays.—Concerning the action of very low temperatures on the phosphorescence of certain sulphides: F. P. **Le Roux**. The maximum potential light energy which can be induced in a given phosphorescent body by a given light is independent of the temperature. Variations of temperature can only have an influence on the velocity of transformation of the potential into the actual light energy.—On a supposed demonstration of the existence of the *n*-rays by photographic methods: M. **Chanoz** and M. **Perrigot**. The authors have repeated an experiment of M. Bordier's on the photographic detection of the *n*-rays emitted by tempered steel, with contrary results. They find that two equal masses of lead and tempered steel, placed identically on screens comparable as to thickness and insolation, never give different halos, whatever may be the duration of the exposure.—The special sensibility of the physiological ear for certain vowels: M. **Marage**.—On the fluorides of indium and rubidium: C. **Chabrié** and A. **Bouchonnet**. The fluoride of indium was prepared by dissolving the hydroxide of the metal in hydrofluoric acid, and was found on analysis to possess the composition $In_2F_6.18H_2O$. It emits acid vapours, and is completely decomposed on ignition to redness. On treating rubidium carbonate with hydrofluoric acid and evaporating to dryness the acid fluoride RbF.HF is obtained.—The limit of the reaction between diazobenzene and aniline: Léo **Vignon**. Aminoazobenzene does not react with diazobenzene either in aqueous or alcoholic solution. Aniline reacts with diazoaminoazobenzene chloride in presence of potassium carbonate giving a diazoamine.—Camphene, camphenylone, isoborneol, and camphor: L. **Bouveault** and G. **Blanc**. The tertiary alcohol, methylcamphenylol, was prepared from camphenylone by Grignard's reaction. The reaction of this alcohol with pyruvic acid at 140°–150° C. has been studied.—On the diastatic coagulation of starch: J. **Wolff** and A. **Fernbach**.—The estimation of carbon monoxide in confined atmospheres: Albert **Lévy** and A. **Pécoul**. The authors utilise the reaction first indicated by M. Gautier between carbon monoxide and iodic anhydride at 80° C., modifying the method by receiving the vapours of iodine in a small quantity of pure chloroform. The amount of iodine set free is ascertained calorimetrically by comparison with a set of sealed tubes containing known quantities of iodine. It is possible in this way to measure in four litres of air only down to 1/200,000 of carbon monoxide by volume. A test analysis with an artificially prepared atmosphere is given to show the accuracy of the method.